

Office Action Summary

Application No.

10/667,368

Applicant(s)

NOGUCHI, TAKAFUMI

Examiner

JACOB Y. CHOI

Art Unit

2885

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-29 is/are pending in the application.
- 4a) Of the above claim(s) 26-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date 12/10/2008
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Specification

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims **1-25** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The subject matter of "... *wherein a minimum light-emission value is greater than 0% and equal to or less than 50% of a maximum light-emission value along the entire spectrum of visible light upon white light being emitted from said light-emitting portion*", which does not set forth the best mode contemplated by the inventor, which enables any person skilled in the art to make use of. To further clarify, applicant(s) failed to describe his invention, where a diffraction grating structure may improve the light-emission value greater than 0% or less than 50%. In other words, 0% of a

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maximum light-emission value is sufficient to make and use of this particular device, a diffraction grating structure. Appropriate correction(s) are required.

Election/Restrictions

Newly submitted claims **26-29** are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claimed details of "*an organic EL element*".

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims **26-29** withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Note: Claims in a pending application should be given their broadest reasonable interpretation. *In re Pearson*, 181 USPQ 641 (CCPA 1974).

Things clearly shown in reference patent drawing qualify as prior art features, even though unexplained by the specification. *In re Mraz*, 173 USPQ 25 (CCPA 1972).

Claims **1-8 and 10-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobori (USPN 6,327,554) in view of ODA et al. (US 2002/0180348).

Regarding claims **1** and **24-25**, Kobori discloses a light-emitting portion having a higher refractive index than a refractive index of air (e.g., column 8, lines 20-35; "... a

refractive index being n 1.5 ... a refractive index being 1.8 n 2.1 ... index being 1.7 n 2.1"), and wherein a minimum light-emission value is great than 0% and equal to or less than 50% of a maximum light-emission value when white light is emitted from the light-emitting portion (FIGS 12-21; column 2, lines 10-60; "... the changes in the thickness of films forming an organic EL device give rise to changes in the spectra and luminance of light emitted out of the device ... which enables light to be effectively taken out of even a structure comprising many reflective surface").

Kobori failed to specify a diffraction grating structure.

ODA et al. teaches the diffraction grating structure formed as a constituent element on the organic electroluminescent device and provided to a light-emitting side surface (FIG 2) of the light-emitting outermost surface side of the light-emitting portion (Abstract: "... a diffraction grating is formed ... on the light output side") and teaches a pitch of a fine convex-concave structure being in various range in μm . Also, ODA et al. further teaches that [0032]; "... critical angle for total reflection, its incidence angle can be reduced to a value smaller than the critical angle by controlling the grating interval property"; FIG 4 shows the 1st, 2nd, and 3rd order diffraction in relation to incidence angle and exit angle, & [0037]; "... the wavelength of the electroluminescent device is in the region of visible light (i.e., in the wavelength region of 350 to 800 nm)", where the peak portion of the spectrum of the emitted light is considered to be the 1st, 2nd, and 3rd order diffraction from an exit angle of 36, 46, and 60 degrees.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify teachings of Kobori with a diffraction grating element of ODA et al. to

improve the light extraction efficiency of the device and its viewing angle(s), also it is preferable for the grating structure with less internal reflection by adjusting the index of refraction in order to prevent light emitted from the organic EL being reflected at the grating structure and traveling backward. To further clarify, it would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the workable range of the diffusion grating to improve the light extraction efficiency of the device, also it is preferable for the grating structure with less internal reflection by adjusting the index of refraction in order to prevent light emitted from the organic EL being reflected at the grating structure and traveling backward, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 2, Kobori discloses in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses a color separation filter (column 20, lines 1-20) provided between the light-emitting portion and the light-emitting side surface, wherein a minimum value of a spectral product obtained from a light-emission waveform of the white light emitted from the light-emitting portion and a spectral transmittance of the color-separation filter is equal to or less than 50 % of a maximum value (*at least 50 % in a wavelength region of 300 to 700 nm*) thereof, whereby the minimum light-emission value is equal to or less than 50 % of the

maximum light-emission value when the white light is emitted from the light emitting portion.

Regarding claim 3, Kobori discloses in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses a color-separation filter (column 20, lines 1-20), which has minimum transmittance of equal to or less than 50 % of maximum transmittance is used for the color-separation filter.

Regarding claim 4, Kobori discloses in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the light-emitting portion includes light-emitting materials for at least two primary colors emitting the white light among light-emitting materials for three primary colors.

Regarding claim 5, Kobori discloses in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses a light-emission ratio of the light-emitting materials for the at least two primary colors among the light-emitting materials for the three primary colors is adjusted to make the minimum light-emission colors is adjusted to make the minimum light-emission value equal to or less than 50 % of the maximum light-emission value when the white light is emitted from the light-emitting portion.

Regarding claim 6, Kobori discloses in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the light-emitting portion includes the light-emitting materials for the three primary colors.

Regarding claim 7, Kobori discloses in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the light-emitting materials exhibit light emission by singlet exciton (column 16, lines 5-10).

Regarding claim 8, Kobori discloses in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the light-emitting materials exhibit light emission by triplet exciton (column 16, lines 5-10).

Regarding claim 10, Kobori discloses in view of ODA et al. discloses the claimed invention, explained above. In addition, ODA et al. discloses a ratio of the depth to the pitch in the fine convex-concave structure ranges from 0.1-10 [0037]. As explained above, it would have been obvious to modify teachings of Kobori with a diffraction grating element of ODA et al. to improve the light extraction efficiency of the device.

Regarding claim 11, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the light-emitting portion includes light-emitting materials (column 20, lines 1-20; "... *an optical thin film such as a dielectric multilayer film may be used ... gives out light from the phosphors contained therein for the color conversion of light emission, and is composed of three components, a binder, a fluorescent material and a light absorbing material*") for at least two primary colors emitting the white light among light-emitting materials for three primary colors.

Regarding claim 12, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses a color-separation filter (column 20, lines 1-20; "... *the substrate may be provided with a color filter film ... it is preferable to control the properties of the color filter in conformity to the light emitted*

from the organic EL device ... thereby optimizing the efficiency of taking out light emission and color purity").

Kobori failed to suggest a spectral transmission of the color-separation filter is proximately 7% of a maximum value.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to specify the spectral transmission of the filter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 13, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the combination of the light-emitting portion and the color separation filter suppresses the transmitted light to extent in the wave range ± 25 nm or more apart from the maximum light emission wavelength of the light-emitting materials (column 8, lines 20-60; "... a wavelength region of 300 to 700 nm).

Regarding claim 14, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses a color separation filter provided between the light-emitting portion and the light-emitting side surface, wherein a minimum value of a spectral product obtained from a light-emission waveform of the white light emitted from the light-emitting portion and a spectral transmittance of the color-separation filter is approximately 2% of a maximum value thereof (column 8, lines 20-60; "... a luminance variation n is confined within $\pm 5\%$).

Regarding claim 15, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the light-emitting portion comprising, a glass substrate ("p-layer"), a transparent electrode formed on one side of the glass substrate, a light-emitting layer ("de") formed on the transparent electrode and a rear electrode formed on the light-emitting layer (FIG 3). ODA et al. teaches the diffraction grating structure is formed on the other side of the glass substrate [0006, 0049, and 0052] that is the light-emitting outermost surface of the light-emitting portion (FIG 2). As explained above, it would have been obvious to modify teachings of Kobori with a diffraction grating element of ODA et al. to improve the light extraction efficiency of the device.

Regarding claim 16, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses a color separation filter (column 20, lines 1-20) formed between the glass substrate and the diffraction grating structure. It has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

Regarding claim 17, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, ODA et al. discloses the diffraction grating structure is obtained by providing the fine convex-concave structure to the surface of the other side of the glass substrate. As explained above, it would have been obvious to modify teachings of Kobori with a diffraction grating element of ODA et al. to improve the light extraction efficiency of the device.

Regarding claim 18, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, ODA et al. discloses the diffraction grating structure is formed by bonding an optical film separately manufactured as a transmission type optical film that has the fine convex-concave structure to the other surface of the glass substrate. It has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. As explained above, it would have been obvious to modify teachings of Kobori with a diffraction grating element of ODA et al. to improve the light extraction efficiency of the device.

Regarding claim 19, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, ODA et al. discloses the diffraction grating structure is obtained by providing the fine convex-concave structure. It has been held rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70. As explained above, it would have been obvious to modify teachings of Kobori with a diffraction grating element of ODA et al. to improve the light extraction efficiency of the device.

Regarding claim 20, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, ODA et al. discloses the diffraction grating structure is formed by bonding an optical film separately manufactured as a transmission type optical film that has the fine convex-concave structure to the outer surface of the color separation filter. It has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ

177, 179. As explained above, it would have been obvious to modify teachings of Kobori with a diffraction grating element of ODA et al. to improve the light extraction efficiency of the device.

Regarding claim 21, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, ODA et al. discloses the color separation filter is formed to have a single layer structure. It has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893). As explained above, it would have been obvious to modify teachings of Kobori with a diffraction grating element of ODA et al. to improve the light extraction efficiency of the device.

Regarding claim 22, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the color separation filter is formed to have a multi-layer structure (column 20, lines 1-20).

Regarding claim 23, Kobori in view of ODA et al. discloses the claimed invention, explained above. In addition, Kobori discloses the light emitted is substantially white light (column 23, lines 10-30; "... *various wavelengths exist as in white light*").

Response to Arguments

Applicant's arguments filed August 25, 2008 have been fully considered but they are not persuasive. Applicant(s) has attempted to correct issues under 35 USC § 112 first paragraph, but claim(s) remain rejected. Applicant(s) has failed set forth the best mode, which enables any person skilled in the art to make use of the claimed invention. For example, claimed limitation recites "... a minimum light-emission value is greater

than 0% or less than 50% ... etc.”, which does not set forth the best mode. Thus, claims have been rejected as examiner best understands them. Again, applicant(s) failed to describe his invention, how diffraction grating structures and/or a color separation filter improve/alter the maximum light-emission value of the particular device.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACOB Y. CHOI whose telephone number is (571)272-2367. The examiner can normally be reached on Monday-Friday (10:00-7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong-Suk (James) Lee can be reached on (571) 272-7044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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